Collaboraire Quizto Sin,

Pre- Clas Questions T. SFIS) = { (RIS -FIS)

$$F(s)\left(s+\gamma_2\right) = \frac{1}{2}R(s)$$

$$F(s) = \frac{1}{2}$$

$$R(s) = \frac{1}{2}$$

$$S+\gamma_2$$

2.
$$F(s) = \frac{1}{2} \cdot p(s)$$

 $5+\frac{1}{2}$
 $= \frac{1}{2}$

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5(5+ 12)

$$\frac{Z(s)(s^2+n^2)}{Z(s)} = n^2 F(s)$$

$$\frac{Z(s)}{F(s)} = \frac{n^2}{s^2+n^2}$$

4. Gent (s) =
$$G_{\text{those}}$$
 (r) · G_{cont} (s)

$$= \frac{1}{5^2 + 1^2} \cdot \frac{1}{5^2$$

ral network described by the following equations,

$$x^{0} = x$$
 (1)
 $x^{k+1} = \phi(W^{k}x^{k} + b^{k}) \quad k = 0, \dots, \ell - 1$
 $f(x) = W^{\ell}x^{\ell} + b^{\ell}.$

The next two lemmas characterize confidence ellipsoids & for Gaussmood toxumiables and random variables with known arst two mon xits.

Lemma 1 Let $X \sim \Lambda(\mu, \Sigma)$ be an n-dimensional Gaussian random variable. Then the p-level confidence region of X is

Rel.U., etc.) is applied coordinate-wise to the pre-activation
$$(z) = 0$$
 $(z) = 0$ $($

For non-Gaussi v random variables, we can use Cheby-shev's inequality character the conducted lipsoids, if we know the first two moments

Although our framework is applicable to all activation func- $\varphi(x) = \max(x, 0).$

In deterministic safety verification, we are given a bounded set $\mathcal{X} \subset \mathbb{R}^{n_o}$ of possible inputs (the uncertainty is mapped by the neural network to a para 21 f(X). The desirable properties that we would like to verify can often be described by a set S C E " in the output space of the neural network, which we call the safe region. I context, the network is sale if the sale i

In a deterministic setting, reachability analysis and safety quantify the proportion of inputs for which the safety is given a safe region S in the output space of the neural neural network maps the random input X to the safe region,

for special cases. As a result, we settle for providing Poker

$$r(f(X) \in S) > n$$

with decision variable ∈ [0, 1). By Lemma 3, the optimal solution satisfies type : (+) $Pr(f(X) \in S) > 3$

(b) is correct because 2/4) will invoke e-12t less. decay) Sin (~2+) a (oscillatory), at 2 1/1) (untaker on No oscillatory) elements are visible in (a) or (c) and that (a) shows a considered defined as any set $\mathcal{E}_p \subseteq \mathbb{R}^n$ for which $\mathbf{Pr}(X \in \mathcal{E}_p)$ Ep) ≥ p. set le., f(Ep) ⊆ S. By lemma 3 S is a p-level confidence - per for the confidence - per set le., At rong la immorphe

Z(s) = Gsubelite (s). 5 Augus ed Tid (S+Yz)(SZ+Z) of Silveron $p \in (0,1)$, then the network is safe with probability at least

p. In pascular, hot as best lower band corresponds to the non-convex pour country protection 3 St & mods2+n2 mixes